# CANADA'S SCHOOLNET

## LEARNING WITHOUT BOUNDARIES



CONNECTIVITY

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Canada

Options for bo
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Do you want to connect your school to the Internet? Are you getting lost in all the emerging technologies? Here are some options to get you started.

There are two types of connectivity: external and internal.

***External connectivity*** refers to connecting schools to the Internet and schools to each other. Technological choices for external connectivity are influenced by the geographic location and size of your school, the learning applications you plan to support, and your budget.

***Internal connectivity*** refers to connecting the computers in a school together to form an intranet. Ethernet has become the networking standard for internal connectivity. Ethernet networks are constructed in a star configuration with individual computers connected to hubs or switches, but you can use different approaches to wire computers to the hub or switch.

N E C T I V I T Y

external and internal connectivity are displayed in the

On March 30, 1999, through the efforts of Industry Canada's SchoolNet and its provincial, territorial and private sector partners, Canada became the first nation in the world to connect its schools and public libraries to the Information Highway. SchoolNet continues to work with its partners to extend connectivity from schools to classrooms by March 31, 2001, bringing the benefits of the Information Highway to Canadian learners. This will result in 250,000 connected computers, an equivalent of one per classroom.

We must also champion new methods of connectivity to offer more students access to the creative and sophisticated learning tools that broadband networking technology makes possible. The SchoolNet Technical Access Registry will be a key source of connectivity solutions for the Kindergarten to Grade 12 education community in Canada. It will provide a repository of connectivity solutions, a collection of case studies and best practices, an interactive planning guide and much more.

This brochure is one of five describing the activities of the Working Groups of the SchoolNet National Advisory Board. SchoolNet is a collaborative initiative of federal, provincial and territorial governments, the private sector and the education community, to connect schools and libraries to the Internet and is part of Connecting Canadians, the Government of Canada's strategy to keep Canada among world leaders in connecting its citizens to the Internet. The other brochures in this series are Professional Development, Research, Measurement, and Social Issues.

To obtain additional brochures, a detailed technical paper on connectivity or more information on Canada's SchoolNet, visit www.schoolnet.ca or contact:

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155 Queen Street – 4th Floor
Ottawa, ON K1A 0H5
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schoolnet@ic.gc.ca
1-800-575-9200

| Connectivity Method | Description | |
|---|---|---|
| TERRESTRIAL | | |
| Dial-up Internet | Connecting to the Internet through a modem and telephone lines | 56 Kbps connecti |
| ISDN | A circuit-switched digital technology used to create point-to-point links to Internet service providers (for dedicated connections) or between buildings | Basic ra Kbps di together |
| Dedicated connections | A connection between a school and an Internet service provider | Varies fr |
| XDSL | High speed Internet services – presently offered by several companies; can also be used to connect buildings | Asymm 1 Mbps out of t |
| Cable-based modems | Offered by many cable TV companies | Asymm about 3 to 10 M bandwi school i |
| Fiber optics | Unused carrier fiber or fiber installed by school board is used to transmit data between schools and school board office | Depend transmi |
| Ethernet, hub or switched LAN | Applicability depends on the age and architecture of the school – running cables through ceilings and walls can be problematic | Cables Mbps E at prese |
| Powerline technology to connect computers in a school together to form a LAN | Uses existing electrical wiring to transmit data – new technology | |
| WIRELESS | | |
| LMCS (Local Multipoint Communications Systems) Operates in 28 GHz Spectrum | A broadband wireless telecommunication carrier service can be used to connect schools to an Internet service provider | Undete May be |
| MCS (Multipoint Communication Systems) Operates at 2.5 GHz | Radio systems where a main hub radio station communicates with many locations in an area – can carry Internet access, video and other applications | Undete May be |
| ISM (Industrial, Scientific, and Medical) Band Unlicensed bands at 900 MHz, 2.4 GHz, 5.0 GHz and 24 GHz | Unlicensed terrestrial wireless technology for external and internal use | Bandw externa |
| Wireless technology to connect computers in a school together to form a LAN | Uses spectrum technology to transmit data over short distances indoors | 1 Mbp A few |
| SATELLITE | | |
| Satellite-Based Datacasting | Internet feeds to schools are via satellite, return pads are via wireline or MSAT technology. SchoolNet uses the DirecPC service that implements this approach | Satellit schools |
| VSAT | Two way satellite service: can be used for Internet connectivity | Various |
| Future Multimedia Satellite service using Ka-band | New Ka band multimedia satellite services are being developed in next 2-3 years | Multim |

| width | External Connectivity | | | Internal Connectivity |
|---|---|---|---|---|
| | Urban | Rural | Remote | |
| lems give reasonable | ✔ | ✔ | ✔ Some Use | Non Applicable |
| DN supports two 64 channels. Can be bonded reate one 128 Kbps pipe | ✔ | ✔ | Not Available | Non Applicable |
| 64 Kbps to 45 Mbps (T3) | ✔ | ✔ Up to T1 in some areas | Not Available | Non Applicable |
| l bandwidth of about the school and 300 Kbps hool | ✔ | ✔ Extremely Limited | Not Available | Non Applicable |
| l bandwidth capacity of ps into the school and up out of the school. Shared eans that speed into the ually about 1 Mbps | ✔ | ✔ Extremely Limited | Not Available | Non Applicable |
| the electronics installed to a: up to 1 Gbps | ✔ | ✔ Maybe available in some areas | Not Available | Non Applicable |
| led should support 100 net even if less is needed | Non Applicable | Non Applicable | Non Applicable | ✔ |
| | Non Applicable | Non Applicable | Non Applicable | New proposed technology |
| ed veen T1 and T3 | ✔ | ✔ (in the 127 areas served by a carrier) | Not Available | Non Applicable |
| ed 0 Mbps | ✔ | ✔ | ✔ Maybe available in some areas | Non Applicable |
| between 2-5 Mbps for nectivity | ✔ | ✔ | ✔ | ✔ |
| Mbps products have 10 Mbps | Non Applicable | Non Applicable | Non Applicable | ✔ |
| adcast downstream to to 400 Kbps | Not intended here | ✔ | ✔ | Non Applicable |
| dwidths possible | Not intended here | ✔ | ✔ | Non Applicable |
| capabilities | Not intended here | Available in 2003 | Available in 2003 | Non Applicable |

C T I V I T Y


Cat. No.: C2-486/2000-1
ISBN: 0-662-64816-1
53044 B

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